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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,226	06/19/2003	Sung Gu Kang	CDDC/CHC/011	9786
758	7590	07/28/2005	EXAMINER	
FENWICK & WEST LLP SILICON VALLEY CENTER 801 CALIFORNIA STREET MOUNTAIN VIEW, CA 94041			SANTIAGO, MARICELI	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 07/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	10/600,226	KANG ET AL.	
	Examiner	Art Unit	
	Mariceli Santiago	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8-12,14,15 and 17 is/are rejected.
- 7) ☒ Claim(s) 7,13,16 and 18-21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The Amendment, filed on May 11, 2005, has been entered and acknowledged by the Examiner.

Cancellation of claim 3 has been entered.

Claims 1-2, and 421 are pending in the instant application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-6, 8, 9, 14, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Resasco et al. (WO 01/94260 A1).

Regarding claims 1, 2, 4-6 and 8, Resasco discloses a method for forming carbon nanotubes comprising granularizing a catalyst layer to generate nano-sized granules for growing a plurality of carbon nanotubes (Page 7, lines 4-14), soaking the granularized catalyst layer in a soaking gas before growing the plurality of carbon nanotubes (CH₄, Page 24, lines 15-18), and growing the plurality of carbon nanotubes by exposing the catalyst layer to a plasma source gas selected from a group consisting of CH₄ and C₂H₂, (Page 25, lines 10-24 through Page 26, lines 1-3), wherein the soaking gas is a hydrocarbon-containing gas (CH₄, Page 24, lines 15-18), wherein the catalyst layer is soaked in the soaking gas at a temperature range of

300°C to 500°C in a vacuum environment¹ (Page 23, lines 14-25 through Page 24, lines 1-18).

The recitation “for an electron-emitting device” is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed element is intended to be employed does not differentiate the claimed element from a prior art structure satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ 2d 1647 (1987). While Resasco fails to explicitly state the recitation “to enhance diffusion properties of the granularized catalyst layer”, it is considered that the soaking gas disclosed by Resasco inherently performs the claimed function, according to Resasco disclosure of the same gas and processing conditions as disclosed by applicants.

Regarding claims 9 and 14, Resasco discloses a method wherein the plasma source gas includes an additive gas comprising H₂ (Page 19, lines 16-17). The recitation “to improve the quality of the plurality of carbon nanotubes formed on the catalyst layer” is considered an intended used recitation. It has been held that a recitation with respect to the manner in which a claimed element is intended to be employed does not differentiate the claimed element from a prior art structure satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ 2d 1647 (1987).

Regarding claim 15, Resasco discloses a method wherein the catalyst layer is disposed on a glass substrate (Page 18, lines 16-20).

Regarding claim 17, Resasco discloses a method soaking the catalyst layer in the soaking gas comprises exposing the catalyst layer to a flow of the soaking gas over the catalyst layer (Page 23, lines 14-25).

¹ state of being sealed off from external or environmental influences

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al. (WO 01/94260 A1) in view of Muroyama et al. (US 2004/0108515).

Regarding claims 10-12, Resasco discloses a method of manufacturing carbon nanotubes by use of a plasma source, however, Resasco is silent in regards to the particular plasma source gas used. In the same field of endeavor, Muroyama disclose a method of manufacturing carbon nanotubes from a hydrocarbon gas which provided by means of a plasma source gas selected from the group of a capacitively plasma source, a inductively plasma source and a microwave plasma source (Paragraph [0139]), as such Resasco acknowledges the art recognized equivalents of these plasma gas sources in the field of growing nanotubes by CVD techniques. It would have been obvious to one of ordinary skills in the art at the time the invention was made to use any of the plasma source gas disclosed by Muroyama in the method of Resasco, since the selection of any of these known equivalents would be are considered within the level of ordinary skill in the art.

Allowable Subject Matter

Claims 7, 13, 16 and 18-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 7, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 7, and specifically comprising the limitation of the soaking gas comprises C_2H_2 .

Regarding claim 13, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 13, and specifically comprising the limitation of the additive comprises NH_3 .

Regarding claim 16, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 16, and specifically comprising the limitation of the catalyst layer is soaked in the soaking gas for approximately 1 to 30 minutes.

Regarding claim 18, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 18, and specifically comprising the limitation of the soaking gas is the same gas used in the growing of the carbon nanotubes.

Regarding claim 19, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 19, and specifically comprising the limitation of soaking gas is maintained at a density 10^{10} to 10^{12} , while soaking the catalyst layer in the soaking gas.

Regarding claim 20, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 20, and specifically comprising the limitation of the plurality of carbon nanotubes are formed using a plasma chemical vapor deposition process and a plasma pressure of 0.5 Torr to 10 Torr.

Regarding claim 21, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 21, and specifically comprising the limitation of the growing is performed without flushing the soaking gas from the granularized catalyst layer.

Response to Arguments

Applicant's arguments with respect to claims 1, 2, 4-6, 8, 9, 14, 15 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

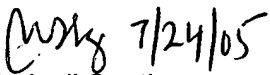
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (571) 272-2464. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 272-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 7/24/05
Mariceli Santiago
Primary Examiner
Art Unit 2879